



U.S. DEPARTMENT OF
ENERGY

Office of River Protection Update Hanford Site

2009 Congressional Nuclear Cleanup Caucus
May 14, 2009

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Washington River Protection
Solutions (WRPS)

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Bechtel National, Inc. (BNI)



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Office of River Protection Mission

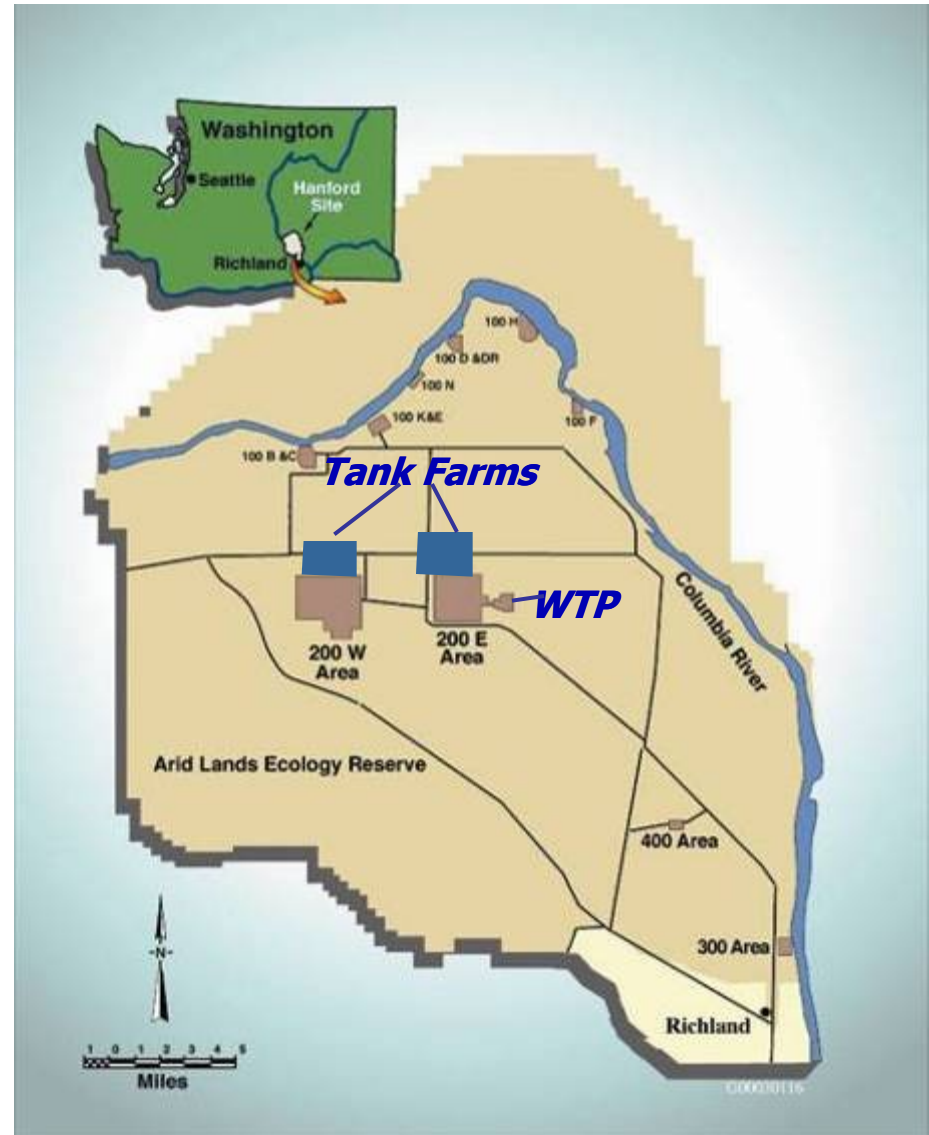
Retrieve, immobilize and dispose of radioactive and chemical tank waste and close Hanford's Tank Farms

Tank Farms

- 177 underground storage tanks
 - 149 Single Shell Tanks (SST)
 - 28 Double Shell Tanks (DST)
- 53 million gallons radioactive and chemical waste
- 194 million curies radioactivity
- 151,000 tons complex chemicals

Waste Treatment Plant (WTP)

- Design/build
- Operational 2019
- Treat and immobilize in glass radioactive and chemical tank waste



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Funding Profile Fiscal Year (FY) 2009 – 2010

	FY2009 (\$M)	FY2010 (\$M)
Appropriation	1009.9	TBD
President's Budget Request	978.4	1098.0

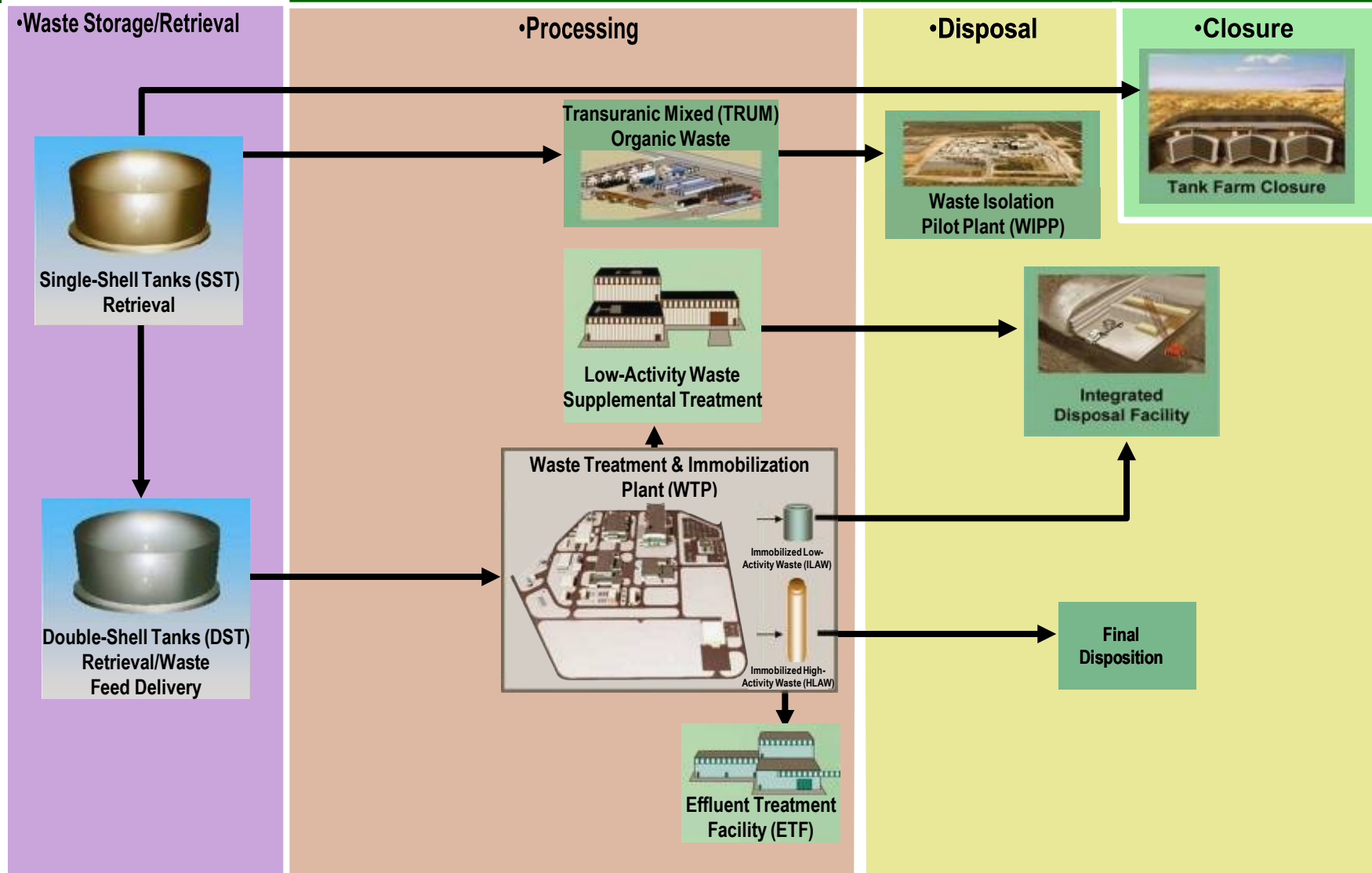
American Recovery and Reinvestment Act	326.0*
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*To ensure adequate controls only 80% of ARRA funds are being allotted to the sites for obligation against contracts. The remaining 20% is being held at Headquarters and will be released after the projects are demonstrating adequate performance. Additionally, only 24% of ARRA funds can be used until all contractor baseline plans have been submitted, reviewed, validated and approved.



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A Large, Technically Complex Mission



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Building on Success @ Tank Farms

- New contractor experienced in tank waste management, treatment, vitrification and closure – leveraging national/international experience
- Contract motivates long-term view, life-cycle/systems approach/integration with WTP contractor
- Protecting workers from radiological and chemical hazards
- Developing/deploying retrieval technologies



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Building on Success @ WTP

- Increasing project performance and accountability
- Resolving last few technical design issues
- Completing design engineering for key WTP facilities
- Acquiring critical plant equipment and components
- Preparing for waste treatment in 2019 by ensuring Tank Farm and WTP projects are fully integrated



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Near Term Focus @ Tank Farms

- Continuing tank retrievals to prepare WTP feed and identify technical needs
- Expanding retrieval technology toolbox for hard heel/leakers
- Reducing overall lifecycle cost/project risks
- Preparing predictable/consistent waste feed delivery system
- Executing Tank Farm ARRA - work infrastructure/facility upgrades



Left: Workers retrieve cameras used in tank C-108 retrieval

Right: Workers deploy the off-riser sampler system in single-shell tank C-103



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Near Term Focus @ WTP

- Continuing to drive project performance and accountability
- Advancing overall project completion from 50% to 58%
- Finalizing/Freezing design from 75% to 82%
 - Shift from engineering to construction focus
- Substantially complete 12 of 18 Balance of Facilities
- Continuing safety vigilance and focus
- Acquiring next generation of workers



Left: A rebar wall is constructed at the High Level Waste Facility



Right: Iron beams are lifted into place at the Pretreatment Facility



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American Recovery and Reinvestment Act (ARRA)

PROJECT	WORKSCOPE	\$
ORP-1000	Tank Farm Infrastructure Upgrades to Support Waste Feed to the Waste Treatment Plant (WTP)	\$326M



Tank Farm Infrastructure

- AP/SY Ventilation
- Waste Transfer Infrastructure
- Level Rise Modifications
- Control Systems
- AP Valve Pits

Other Infrastructure

- Wiped Film Evaporator
- Cross Site Transfer Line Upgrade
- Core Sampling Truck



Waste Feed Infrastructure

- Control Systems (AN, AP, AW, AY/AZ, SY)
- Exhausters
- Characterization

Facility Upgrades

- 242-A Upgrades
- 222-S Upgrades
- Secondary Waste Treatment

Includes major subprojects only



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Bill Johnson, President and Project Manager

Washington River Protection Solutions



washington **river**
protection *solutions*



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New Contractor Team



- Tank operations contractor since 10/1/2008
- International high-level waste experience
 - First two HLW tank closures in DOE; managing ~37 million gallons in 49 tanks—Savannah River
 - Cleaned and grouted 11 tanks—Idaho Cleanup Project
 - Operation of vitrification facilities in the U.S., United Kingdom and France
- \$7.1 billion, 10-years
 - (5-year base period with options to extend up to another five years)

The URS logo, consisting of the letters "URS" in a bold, blue, sans-serif font on a black rectangular background.

The ENERGY logo, featuring a stylized blue and green arc above the word "ENERGY" in a blue, sans-serif font on a black rectangular background.

The AREVA logo, featuring a stylized red "A" above the word "AREVA" in a red, sans-serif font on a black rectangular background.

Integrated Sub-Contractor



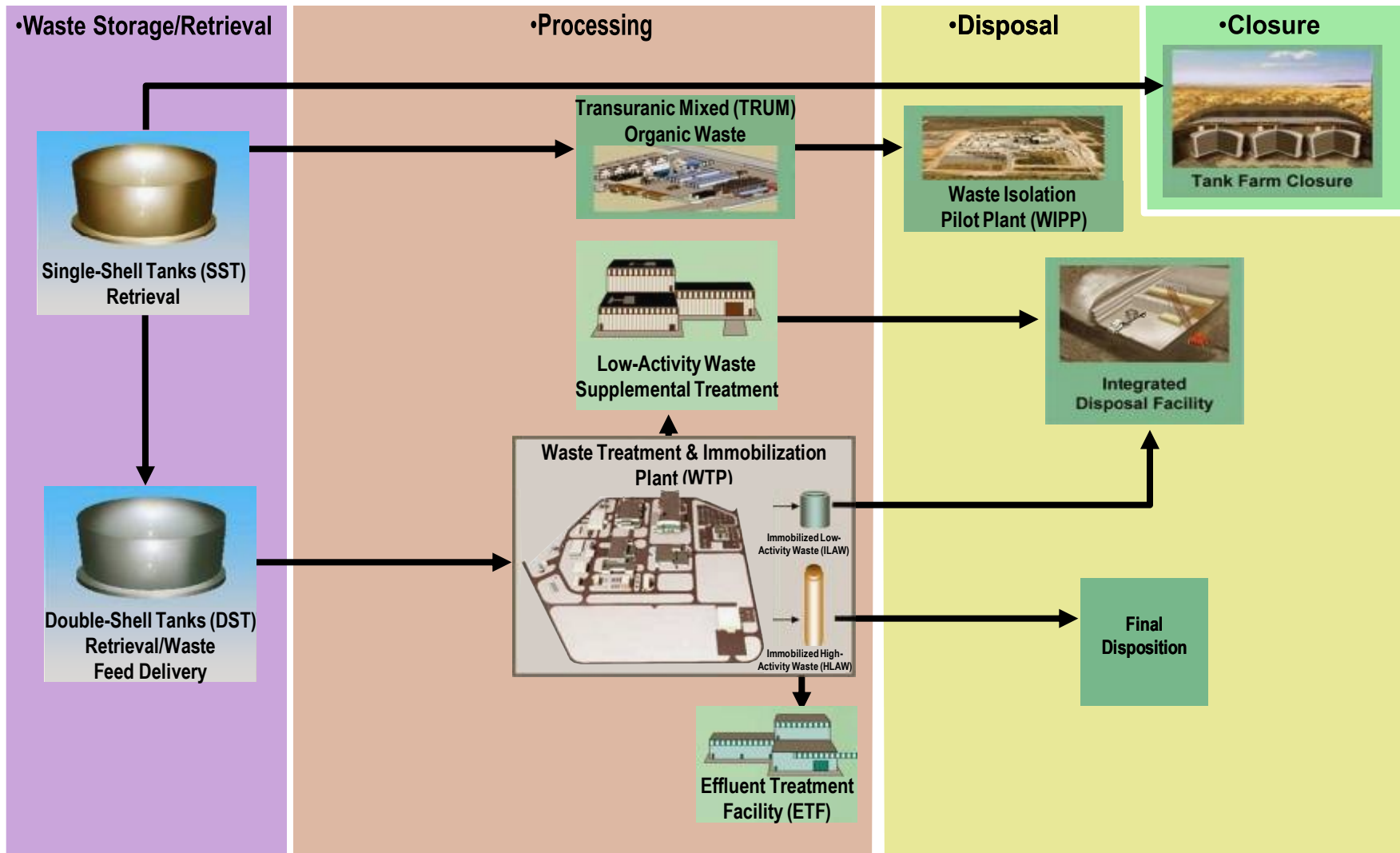
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Project Goals

- Do work safely
- Significantly reduce risks to the Columbia River and the public through retrievals and waste management
- Create sustained waste feed inventory for the Waste Treatment Plant
- Invest in employees
- Reduce lifecycle costs



Safety – Our Way of Life

- Integrated Safety Management System verification
- Working toward VPP Star status for the entire organization in FY 2010
- Total Recordable Case Rate more than 25% lower than FY-08
- Improved program for worker protection from tank vapors



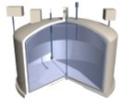
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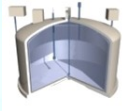
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Hanford Tank Cleanup Status

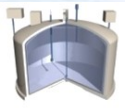
•RETRIEVED



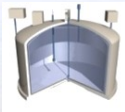
S-112



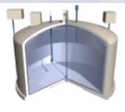
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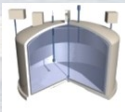
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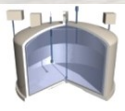
C-203



C-103

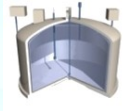


C-106

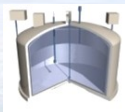


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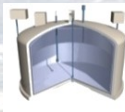
•LIMITS OF TECHNOLOGY



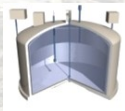
C-109



C-108

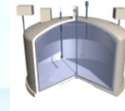


S-102

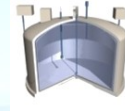


C-110

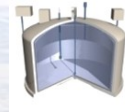
•IN PROGRESS



C-104



C-111



**TBD tank for
Mobile Arm
Retrieval System
(MARS)**

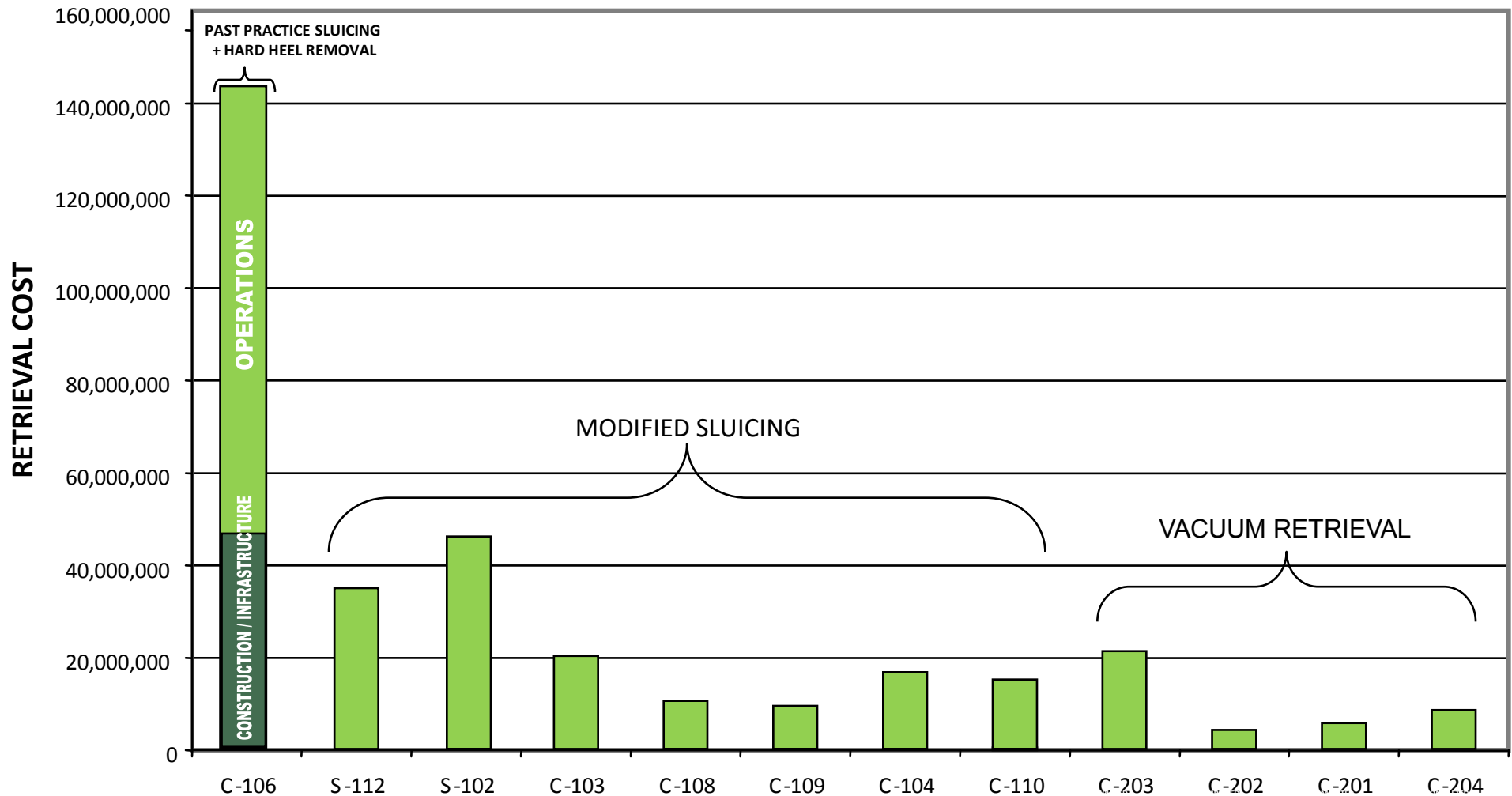


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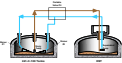







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Retrieval Cost by Tank



SST Retrieval Capabilities Established

- Knowledge of tanks and tank contents
- Set of effective technologies in place
- Preparing final tools for deployment

Type of Tank		Retrieved (11)	Tanks Remaining / Planned Retrieval Method (138 tanks)			
			Modified Sluicing + heel removal 	Vacuum Retrieval 	Vacuum + Vehicle (in development)	Mobile Arm Retrieval System (in development)
	Sound Sludge Tank	1 (Modified Sluicing)	4 +9 small			
	Sound Sludge Tank w/ Hard Heel	3 (Past Practice Sluicing; Acid Modified Sluicing; Foldtrack)	21			
	Assumed Leaker Sludge Tank	1 (Modified Sluicing) +4 small (Vacuum Retrieval)	2	3 small	12	18
	Sound Saltcake Tank	2 (Modified Sluicing; Salt Mantis; Rotary Viper)	12			
	Sound Saltcake Tank w/ Hard Heel		30			
	Assumed Leaker Saltcake Tank		2			25
Total #		11 Tanks Retrieved	80 Tanks	3 Tanks	12 Tanks	43 Tanks

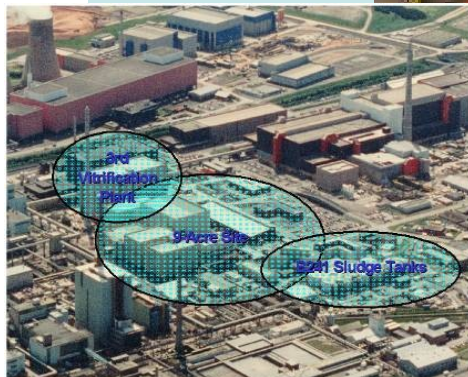
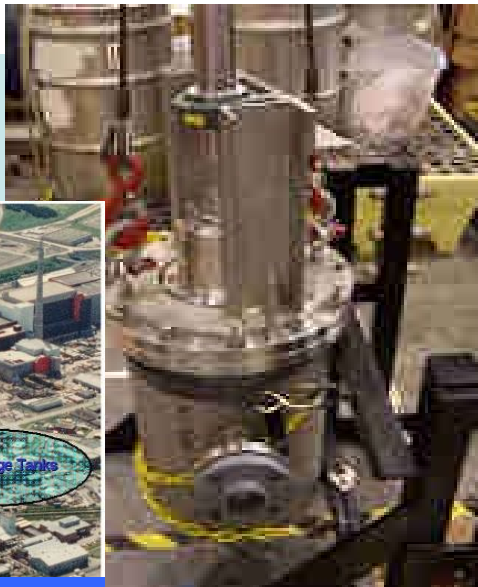
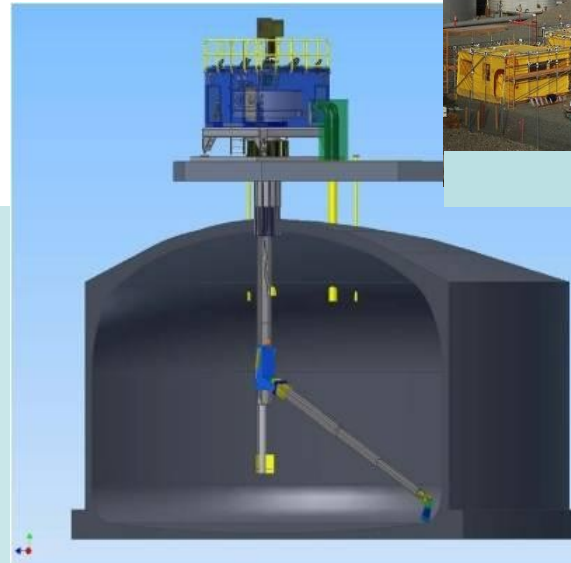


Integrating Best Technology from Commercial Application and Across the DOE Complex

- Applying a suite of proven technologies
 - Mobile Arm Retrieval System (MARS)
 - Tank waste treatment systems
 - Tank closure experience
 - Integration with HLW vitrification facilities



ICP Tank Grouting



Sellafield Waste Treatment Facilities



DWPF Canisters



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SST Retrieval and Closure

- Resumed C-110 retrieval (86% complete; ~150,000 gallons); at limits of technology
- Initiated construction work for C-104 retrieval (60% complete)
- Began design and procurement of robotic arm (MARS)

Other 2009 Work

- Begin C-104 retrieval
- Continue vadose zone work for barrier sites development in TY, S/SX, and C Farms
- Remove 11 hose-in-hose transfer lines
- Complete sampling of C-108 in readiness for closure



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Waste Management

- First evaporator campaign started
- Major facility decontamination/upgrades completed

Other 2009 Work

- Double-shell tank (DST) space management
 - Three evaporator campaigns; ~900,000 gallons of space created
 - Series of waste transfers
- Single shell (SST) & double shell (DST) tank integrity
 - Expert panel
- Facility/farms upgrades
 - 222-S, 242-A



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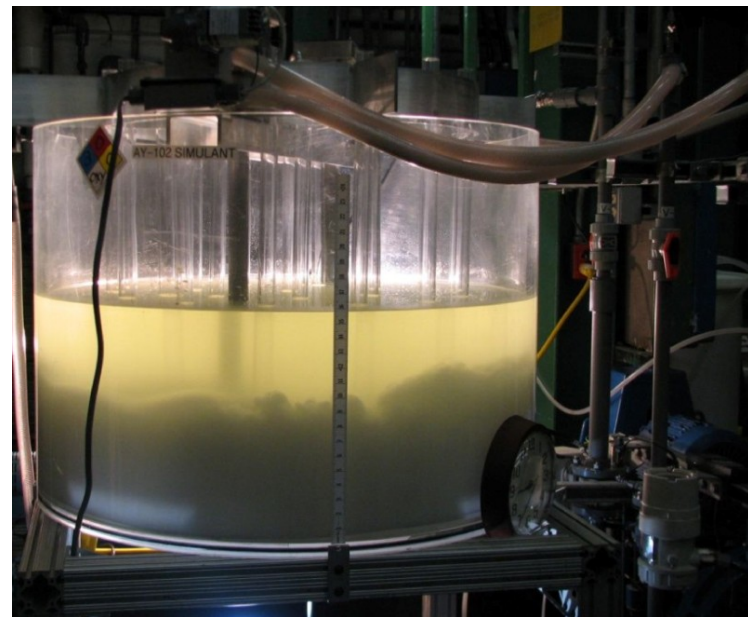
Waste Treatment Plant Support

- Updated River Protection Project System Plan



Other 2009 Work

- Perform waste feed delivery mixing and sampling demonstrations
- Develop Integrated Waste Feed Delivery Plan



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Ted Feigenbaum, Project Director

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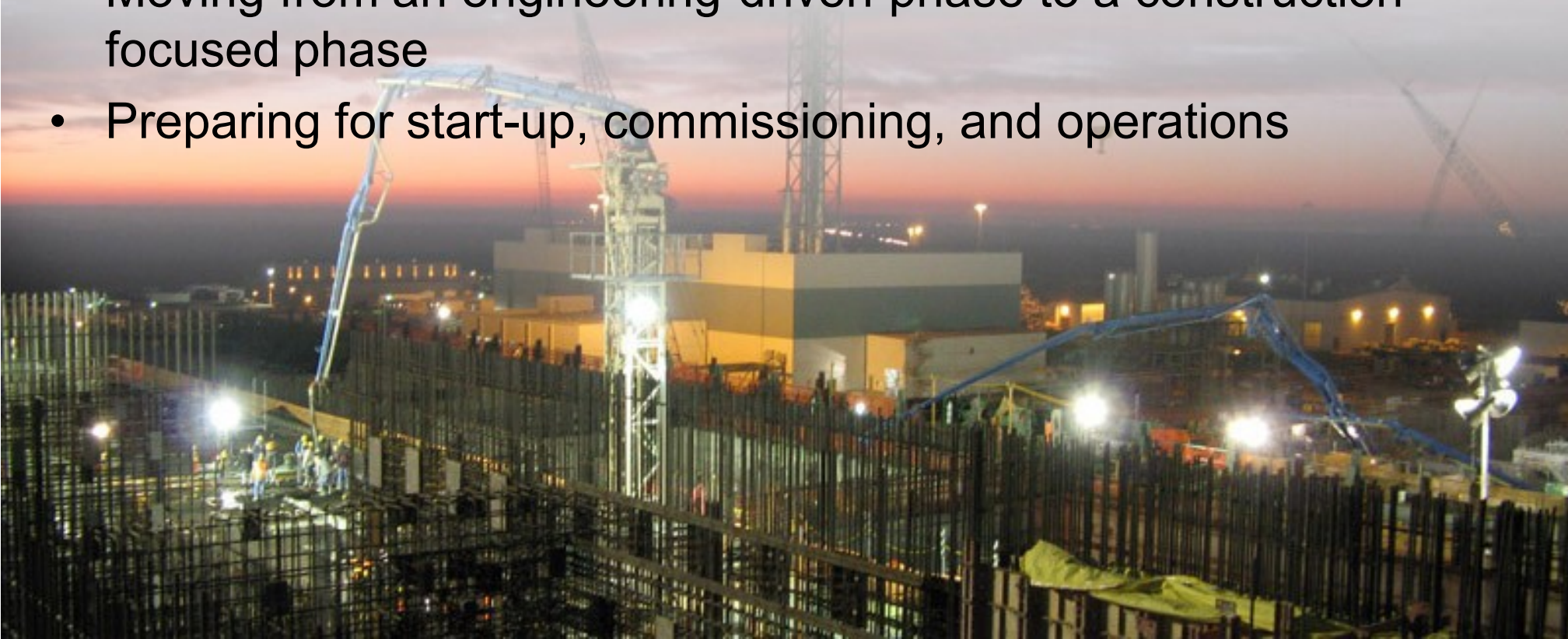
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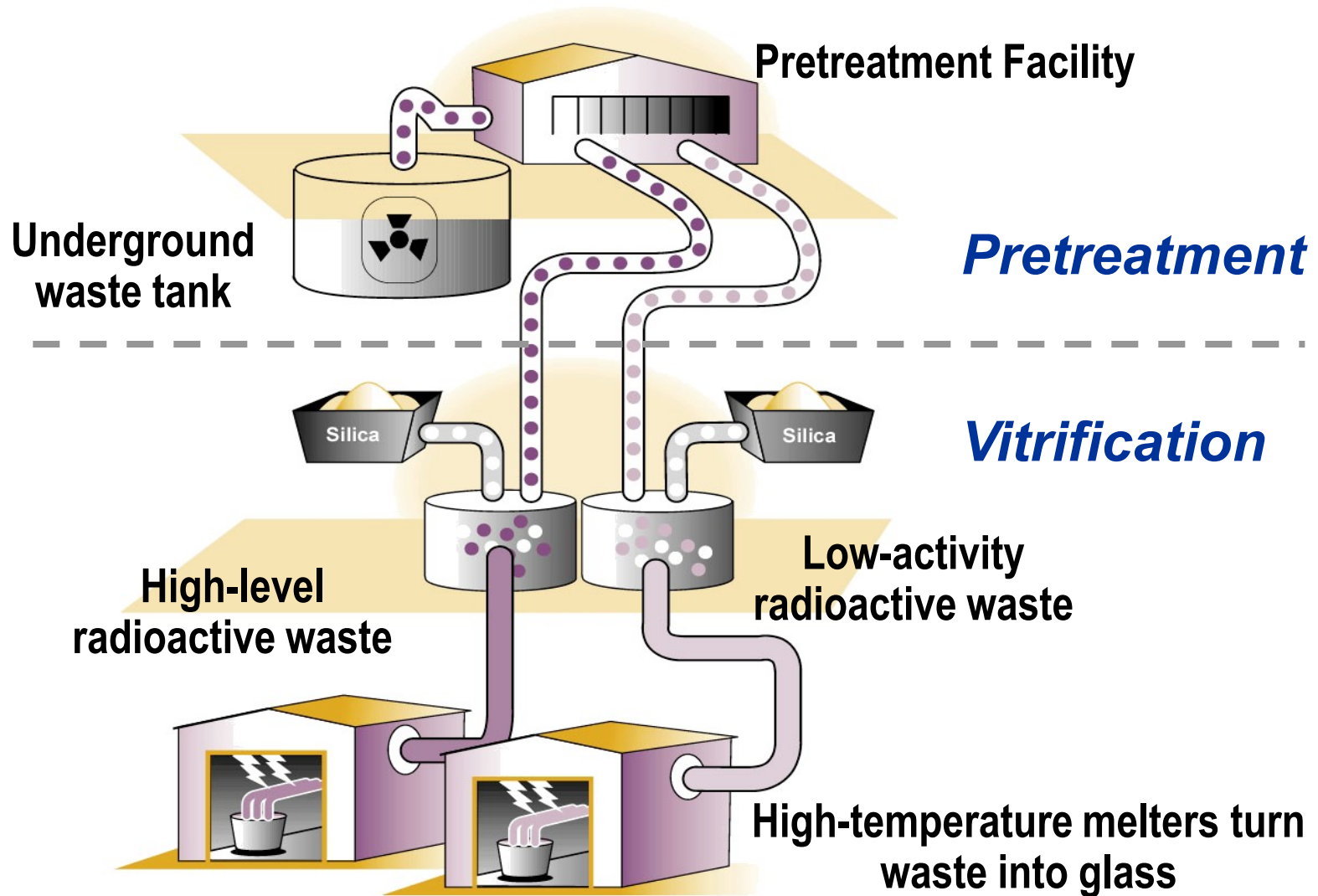
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Progress at Waste Treatment Plant

- Significant progress made in 2008 and 2009, nearing the 50% complete milestone
- Closing technical issues and completing Research and Technology activities
- Moving from an engineering-driven phase to a construction-focused phase
- Preparing for start-up, commissioning, and operations



Waste Treatment Plant Vitrification Process



2001: Vit Plant Construction Began



April 2009: Vit Plant is 47% complete



- \$12.2 Billion
- First-of-a kind
- ~3,000 workforce
 - Union craft
 - Engineering and other professionals
- Complete in 2019



Achieving VPP Merit Status

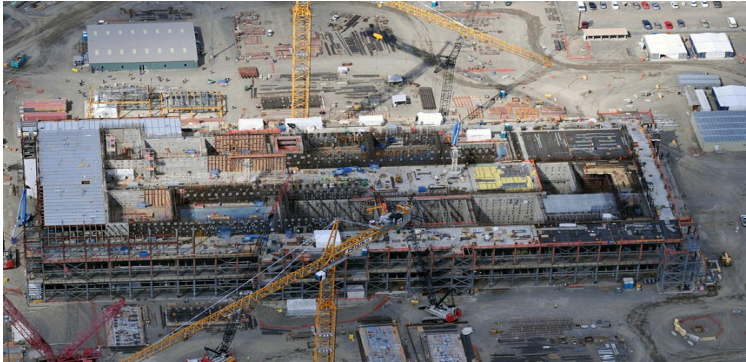


Pretreatment Facility

World's largest radioactive chemical separations facility: **42% complete**

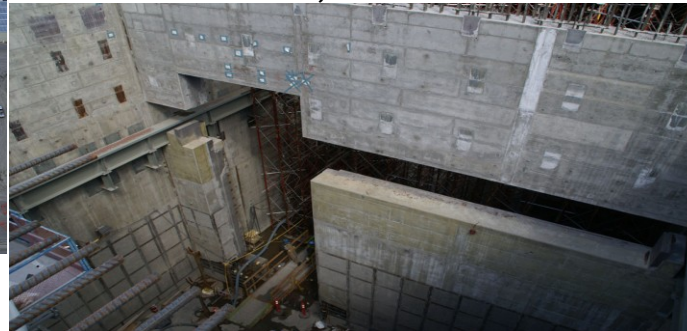
Current progress

- 72% design complete
- 28% construction complete



2009 Planned Accomplishments

- Complete design of all PT structural steel
- Complete walls to elevation +56 ft
- Erect 1,500 tons steel
- Place 43,000 CY concrete



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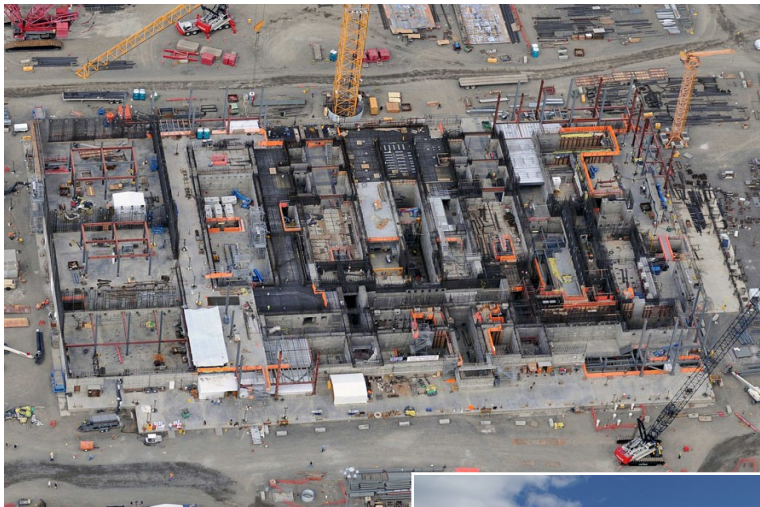
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High-Level Waste Vitrification Facility

Turns high-level waste into glass: 44% complete

Current progress

- 78% design complete
- 23% construction complete



2009 Planned Accomplishments

- Complete design of all HLW structural steel
- Complete all concrete floors from -21 ft to ground elevation
- Erect structural steel and decking to elevation +14 ft
- Place 6,000 CY concrete



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Low-Activity Waste Vitrification Facility

Turns low-activity waste into glass: 65% complete

Current progress

- 88% design complete
- 59% construction complete



2009 Planned Accomplishments

- Erect switchgear building
- Start fabrication of thermal catalytic oxidizers
- Deliver offgas mercury adsorber
- Install cooling water pumps, and melter pour cave insulated liner plate



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Analytical Laboratory

Ensures glass meets regulatory requirements: **43% complete**

Current progress

- 75% design complete
- 54% construction complete

2009 Planned Accomplishments

- Deliver hot cell and waste transfer system equipment, high integrity fans
- Complete majority of liner plate installation and facility fire protection



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Balance of Facilities

Vast infrastructure to support operations: **51% complete**

Current progress

- 72% design complete
- 62% construction complete



2009 Planned Accomplishments

- Complete turnover of third support system for start-up activities
- Install all 13 glass former silos



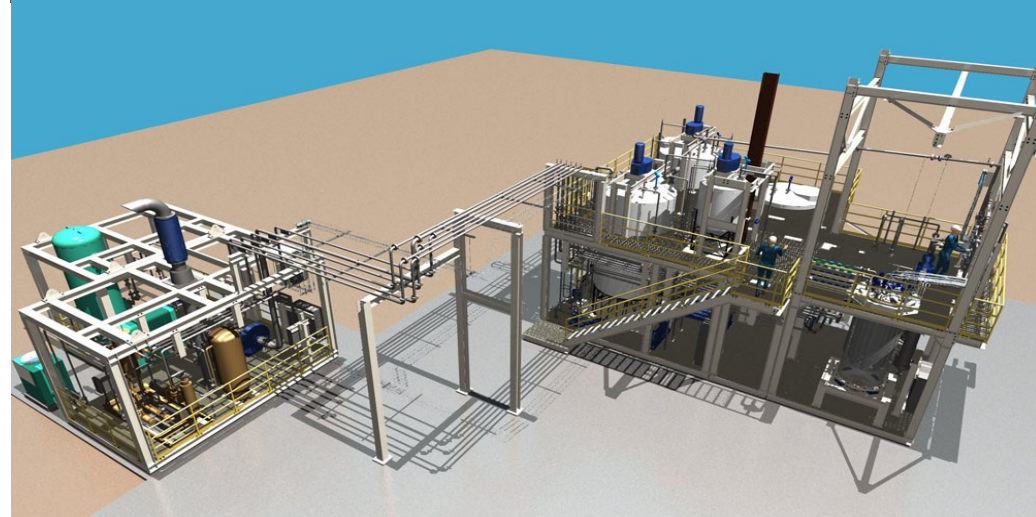
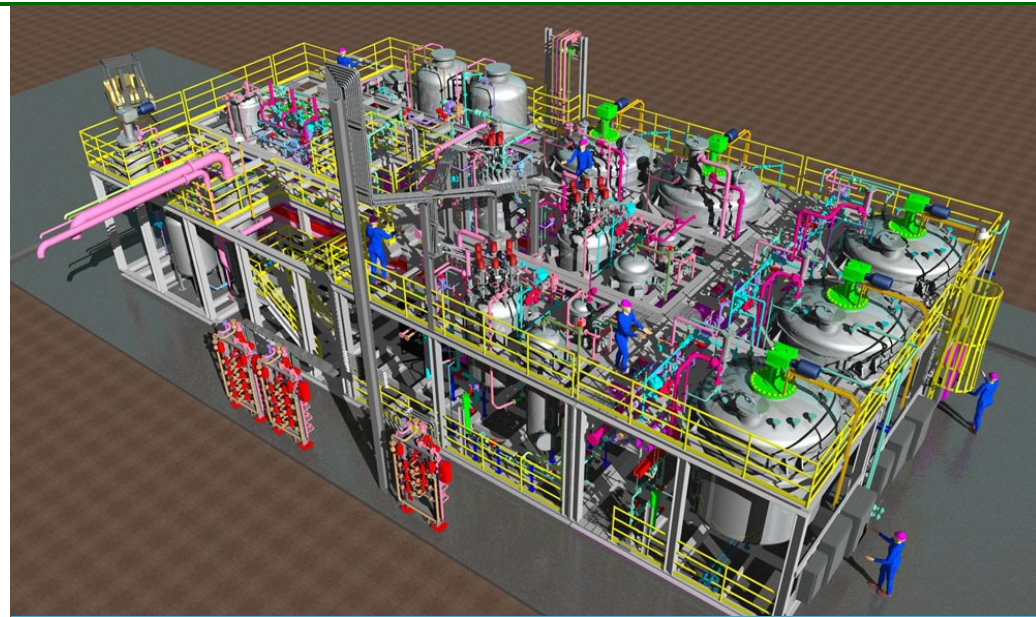
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Driving Technical Issues to Closure

- Resolving technical issues in 2009
 - External Flowsheet Review Team
 - Pulse jet mixing in vessels
 - Autosampling system
 - Hydrogen control including hydrogen in piping and ancillary vessels
 - Fire protection for facility filters
- Proving the effectiveness of key processes
- Identifying and mitigating risks now benefits start-up, commissioning and operations



Closely Integrating with Tank Operations Contractor

- Defining technical interfaces such as tank waste material delivery specifications
- Using Tank Farm data as basis for WTP safety design to reduce complexity and benefit operations
- Ensuring fully compatible work control systems
- Developing aligned engineering, maintenance and training programs to facilitate turnover
- Sharing technical talent and discussing retention of experienced people



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